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ABSTRACT

The purpose of the present study was to examine the possibility of summer regression on Chapter 1 remedial children. Students received computer-assisted instruction in mathematics and reading using programs devised by Computer Curriculum Corporation. Computer performance level data were collected in May 1984 and September 1984, and SRA scores were collected in April 1984. The mathematics data indicated that Chapter 1 remedial students lost at least one-half year of skill in mathematics over the summer vacation. Loss of skills in reading were minimal or non-existent. (BW)

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School teachers have traditionally devoted the month of September to reviewing material from the previous academic year. They have noticed that many students lose information over summer vacation and need to learn or relearn material from the previous year before being able to begin new material. The degree or extent of summer regression has never been adequately investigated. A review of ERIC documents within the last ten years produced no examples of research on summer regression.

The purpose of the present study was to examine the possibility of summer regression in a special group, Chapter I, remedial children. Since these students are below average academically, the pattern of summer loss may not be typical of average students. The following results, therefore, are specific to this group and are not intended as a generalization to other students.

Table I presents data on students receiving mathematics Computer Assisted Instruction (CAI) utilizing programs devised by Computer Curriculum Corporation of Palo Alto, California. The May 1984 computer performance levels in approximate mean grade equivalents and the computer performance levels in September 1984 approximate mean grade equivalents for seven Chapter I schools are presented in the table. The students from all seven schools were functioning at beginning to mid-fifth grade level ($\bar{X}$ = 5.39) at the end of the May 1984 school year. The scores for September 1984 reflect upper fourth grade level functioning ($\bar{X}$ = 4.87) for an average lost of .5 grade equivalents. It can be seen that there is variability in the degree of lost from school to

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school. School #1 lost .83 grade equivalents whereas school #6 lost only .14 grade equivalents. Excluding these two extremes, it appears that most schools lose approximately .5 grade equivalents in mathematics skills over the summer vacation as measured by the computer assisted instruction approximate grade equivalent.

The actual loss is even greater than the table represents. The September level which is represented in the table includes ten days on the computer for the new school year. Computer Curriculum Corporation suggests that students be given ten days of review to assure that an adequate baseline level is obtained at the beginning of September. The process of establishing the baseline involves presentation of problems. Students may be recalling and regaining some lost skills in the process of attaining baseline and consequently their September 15 level presented in the table may actually be elevated from its level on the first day of school. However, the performance level on the first day of school would not necessarily be an accurate measurement of skill in mathematics.

Table II presents another examination of the same material using beginning of April composite mean math SRA scores as the beginning level, and September math computer levels as the comparison level. (The children include the same groups as those in Table I together with additional students who were just beginning CAI for the first time.) The math grade equivalent differences between the SRA and CAI levels are presented in the extreme right hand column. The mean difference is approximately one year, indicating that the summer loss from Spring SRA levels to Fall CAI levels is one full year. Again great variability exists from school to school with some schools exhibiting less than one

year of math regression over summer vacation and others having as much as a 1.6 grade equivalent loss.

Problems exists in this measurement of regression over summer vacation. The SRA is administered at the beginning of April and measures functioning at that time. Students had the benefit of the remainder of April, all of May and ten days in September to make greater gains in math. The SRA levels are an under-representation of the end-of-school year math (May) levels. The September CAI levels reflect the opportunity for gain which has occurred since the SRA was administered. The fact that the September CAI levels are so significantly below the April SRA levels, despite the extra remediation time, implies that basic differences exist between the SRA and CAI measures.

The domain sampled by the SRA and CCC programs and the norms in the separate manuals are not equivalent. Table II, therefore, is a problematic illustration. It is, however, a useful illustration of the degree of regression which would be reported if the SRA were used to measure math performance in Spring and another measure (in this case a CCC program) were used to measure initial math level skills and possible summer regression. From this illustration, it is imperative that loss over the summer be measured by the same measurement tool as was used in Spring. Otherwise a false conclusion can be made about the degree of skills loss over the summer months.

The general conclusion based on the above data indicates that Chapter I remedial students lose at least one-half year of skill in mathematics over the summer vacation (given that the CAI measure is reliable). Teachers dealing with remedial students will certainly need

to review and realize that students do seem to forget or actually lose some mathematics skills over the summer.

Table III presents data on remedial Chapter I students receiving reading Computer Assisted Instruction (CAI) utilizing programs devised by Computer Curriculum Corporation of Palo Alto, California. The May 1984 Computer performance levels in approximate mean grade equivalents and the September 1984 Computer performance levels in approximate mean grade equivalents for seven Chapter I schools are presented in the table. The students from all seven schools were functioning at mid-fifth grade level ($\bar{X}$ = 5.46) in May 1984 according to computer levels. The Computer reading scores for September 1984 reflect a slight decrease in mid-fifth grade level functioning ($\bar{X}$ = 5.36). There is clear variability among schools with some schools losing almost half a year in grade equivalents (.47) and others making slight gains (+ .16). For all schools combined, the .16 loss over summer vacation is not statistically significant. Reading loss over the summer as measured by CAI levels appear to be small or non-existent. Therefore, remedial children lose fewer reading skills than math skills over the summer vacation.

The actual loss in reading over summer vacation may be slightly greater than the table represents. The September level which is presented in the table includes ten days on the computer for the new school year. Computer Curriculum Corporation suggests that students be given ten days to adjust and to establish an adequate baseline for the new year. It may be that this experience allows for some gain in some students. However, since reading is such a complex skill, the probability that ten days of practice would make appreciable improvement in reading skills for most students is highly unlikely.

Table IV presents another view of the reading data using Spring, beginning-of-April composite mean reading SRA scores as the beginning level and September computer levels as the comparison level. (The children include the same group as those in Table II together with additional students who were beginning CAI for the first time). The mean reading grade equivalent differences between SRA and CAI levels indicates a half year grade equivalent gain of (+.5) skills over the summer. Again the variability is clearly evident among schools as in the previous tables but six of seven schools show reading gains over the summer. The same dilemmas occur with Table IV as with Table II. The domain sampled and norms used by SRA and CCC are not equivalent and conclusive comparisons are erroneous. Reading instruction on the computer occurred after the April SRA measure and so CAI gain effects in September are to be expected. However, content validity and norm differences obviate firm conclusions.

In conclusion, summer regression or loss of skills over vacation appears to occur in math remedial students but appears minimal to non-existent in reading remedial students. More extensive September review or returning to earlier levels would appear justified in math but not required in reading. It could be conjectured that once the complex skills acquired in reading comprehension levels are developed, they are not forgotten or lost. In math on the other hand, a student could develop new computational skills without understanding concepts and lack of practice over the summer causes an erosion of the newly developed computational skills.

TABLE I
MATHEMATICS REGRESSION OVER SUMMER VACATION
MATHEMATICS (GRADES 5-8)
Spring CAI to Fall CAI

SCHOOLS	N	May 1984 MEAN GRADE EQUIVALENT	September 1984 MEAN GRADE EQUIVALENT	GRADE EQUIVALENT DIFFERENCE*
1	28	5.35	4.52	(.83)
2	45	5.1	4.44	(.66)
3	25	5.71	5.07	(.64)
4	34	5.85	5.45	(.40)
5	28	5.31	4.85	(.46)
6	23	5.00	4.86	(.14)
7	17	5.50	5.15	(.35)
TOTALS	200	5.39	4.87	(.52)

* ( ) Indicates a decrease in functioning

TABLE II
MATHEMATICS REGRESSION OVER SUMMER VACATION
MATHEMATICS (GRADES 5-8)
Spring SRA to Fall CAI

SCHOOLS	N	SRA (April 1984) MEAN	CAI (September 1984) MEAN	GRADE EQUIVALENT DIFFERENCE*
1	33	4.4	2.8	(1.6)
2	81	4.6	3.21	(1.39)
3	54	5.41	4.36	(1.05)
4	101	4.22	3.34	(.88)
5	42	4.85	3.36	(1.1)
6	28	3.77	2.97	(.80)
7	57	4.48	3.15	(1.33)
TOTALS	396	4.51	3.57	(.94)

* ( ) Indicates a decrease in functioning

TABLE III
READING REGRESSION OVER SUMMER VACATION
READING (GRADES 5-8)
Spring CAI to Fall CAI

SCHOOLS	N	May 1984 MEAN GRADE EQUIVALENT	September 1984 MEAN GRADE EQUIVALENT	GRADE EQUIVALENT DIFFERENCE *
1	17	5.76	5.87	.11
2	20	5.77	5.47	(.30)
3	26	5.87	5.40	(.47)
4	31	5.49	5.65	.16
5	24	5.41	5.17	(.24)
6	21	5.25	5.20	(.05)
7	17	6.10	5.65	(.45)
TOTAL	156	5.46	5.30	(.16)

* ( ) Indicates a decrease in functioning

TABLE IV
READING REGRESSION OVER SUMMER VACATION
READING (GRADES 5-8)
Spring SRA to Fall CAI

SCHOOLS	N	SRA (April 1984) MEAN	CAI (September 1984) MEAN	GRADE EQUIVALENT DIFFERENCE*
1	29	5.23	4.94	(.28)
2	52	4.37	4.67	.30
3	100	4.14	4.69	.55
4	74	4.05	4.88	.83
5	38	3.15	3.78	.63
6	36	3.27	3.97	.70
7	67	4.08	4.47	.39
TOTAL	396	4.05	4.55	.50

* ( ) Indicates a decrease in functioning